# Montana Outdoors

January–February 2008

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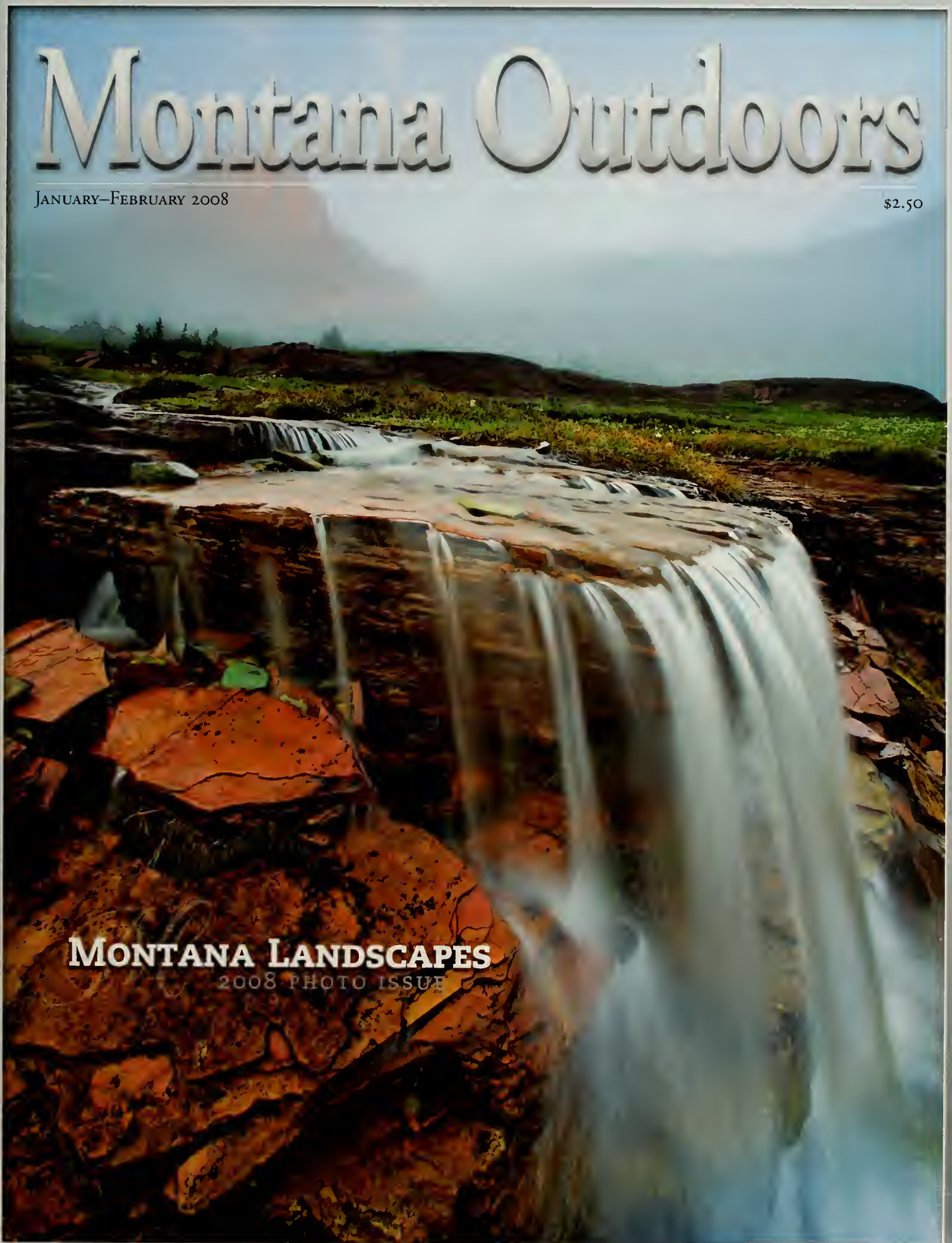

## Montana Landscapes

2008 Photo Issue

Montana Fish, Wildlife & Parks

fwp.mt.gov

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Though we try to fill each issue of *Montana Outdoors* with engaging articles covering major fish, wildlife, and state parks issues, we know that many readers subscribe primarily for the pictures. "Love the fantastic photos," reads a typical letter arriving in our Helena office. And why not? *Montana Outdoors* features some of the nation's top professional nature photographers. And due to the proliferation of high-quality digital cameras, we're also seeing—and publishing—more exciting images from photographers new to the field.

This annual photo issue is our way of gratifying your desire to see Montana's beauty depicted in full and glorious color. It's the issue you can thumb through leisurely, marveling at the state's grandeur and the photographic skills required to capture such remarkable images.

Still, we hate to let pass any opportunity to convey important information about the state's outdoors. So in this issue we not only show off some of Montana's most spectacular landscapes but also briefly explain how scientists describe them. Montana is composed of four distinct ecosystems—montane forest, intermountain grassland, plains grassland, and shrub grassland—each with its own particular plant communities, climates, and soils. Montana Fish, Wildlife & Parks staff and other natural resources professionals are gaining new knowledge about these ecosystems and the fish and wildlife living there. For example, wildlife biologists are studying the relationship between sage-grouse population size and natural gas development that disrupts shrub grasslands. In montane forests, fisheries biologists are monitoring restored westslope cutthroat trout populations. And researchers are tracking the decline of Townsend's big-eared bats in caves of intermountain grasslands.

Read more about the state's four ecosystems and seven critical fish and wildlife communities inside this issue of *Montana Outdoors*. Or just skip the text and enjoy the photographs. We'll understand.

—Tom Dickson, Editor

Erik Petersen
**Above:** Changing fall colors wash across cottonwoods on an island in the Missouri River breaks.

Daniel W. Hall
**Right:** A mountain bluebird flies over still water.

Chuck Haney
**Cover:** The Hanging Gardens at Logan Pass, Glacier National Park.

JOHN LAMBING
**Facing page:** Hidden waterfall in a gorge on the Upper Jocko River, near Arlee.

TIM ZIMBELMAN
**Above:** Fallen alder leaves at creek's edge, near Grass Range.

JOSEPH JENKINS
**Below:** Old wood tangle, Judith Mountains.

NELSON KENTER
**Above**: Pronghorn does and fawn.

ANGIE KIMMEL
**Facing page**: Foxtail barley at sunrise, Missouri Headwaters State Park.

KEVIN R. FREDENBERG
**Far right**: Bumblebee on bitterroot blossom.

LARRY DEARS
**Right**: Grasshopper, near Darby.

Fish and wildlife community **GRASSLAND COMPLEX**

Grassland communities occur in broad western mountain valleys, in high mountain meadows, and on the plains of eastern Montana. Grass stands of various densities are characteristic of these areas. The mosaic of different grass species is found in open lands, often interspersed among shrubs. More terrestrial species in need of conservation depend on grassland complexes than on any other dry plant community in Montana.

Coverage: 34% of Montana
(31,551,627 acres)

Number of species that depend on this habitat for breeding and survival:

| | |
|---|---|
| 7 | Amphibians |
| 12 | Reptiles |
| 121 | Birds |
| 62 | Mammals |

Examples of animal and plant species:

| | |
|---|---|
| Pronghorn | Silvery lupine |
| Long-billed curlew | Prairie Junegrass |
| Milksnake | Missouri goldenrod |
| Pallid bat | Arrowleaf balsamroot |
| Grizzly bear | Switchgrass |

NEAL & MJ MISHLER
**Above:** White-faced ibis.

DAVE SHARPE
**Right:** Crayfish.

Fish and wildlife community: **PRAIRIE STREAM**

Thousands of miles of prairie streams flow through the semiarid region of eastern Montana. Some of these low-elevation creeks flow year round, while others run intermittently, primarily in early summer after snowmelt and spring rains. Prairie streams are warmer than their counterparts in mountainous western Montana and support a wide diversity of fish species. These waters also support many types of amphibians and reptiles, and are vital for mule deer and many other terrestrial wildlife species.

JUDY WANTULOK
**Left:** Prairie stream in eastern Montana.

PATRICK RUMMANS
**Below:** Marbled godwit.

Coverage: 91,189 prairie stream miles in Montana

Number of species that depend on this habitat for breeding and survival:

2 Mussels
2 Crayfish
21 Fish

Examples of animal and plant species:

| | |
|---|---|
| Pearl dace | Bulrush |
| Iowa darter | Wet sedge |
| Calico crayfish | Hall's rush |
| Lake chub | Plains minnow |

Catherine Walters Adams
**Facing page:** Crested wheatgrass.

Tony Bynum
**Top:** Mule deer bucks in a north-central Montana grain field.

Rebecca Stumpf
**Above:** Shocking oats south of Corvallis.

## Fish and wildlife community: MIXED BROADLEAF FOREST

Within western Montana's mixed broadleaf forests are aspen groves that appear within grassland openings or along softwood forests. Aspens magically appear as yellow swaths against the surrounding green conifers when their leaves turn in fall. Sunlight passes easily through the canopy of mature aspens, promoting the growth of an understory composed of grasses, wildflowers, and wet meadow species. This habitat complexity provides food and shelter for a wide mix of wildlife. Within the mixed broadleaf forests of eastern Montana are woody draws—dry streambeds that support some of the highest concentrations of wildlife in the region. Though wet only for a short time each spring, woody draws trap enough moisture to support a great diversity and density of plant species. Woody draws provide essential cover, food, and water for many wildlife species in eastern Montana that otherwise would not exist.

CHUCK HANEY
**Facing page:** Aspen grove dusted with snow at Marias Pass, near East Glacier.

LARRY DEARS
**Left:** Red-naped sapsucker.

TIM ZIMBELMAN
**Above:** Aspen leaf.

Coverage: 1% of Montana (883,498 acres)

Number of species that depend on this habitat for breeding and survival:

17 Birds
9 Mammals

Examples of animal and plant species:

| | |
|---|---|
| Blue grouse | Quaking aspen |
| American beaver | Green ash |
| Elk | Plains cottonwood |
| American dipper | Paper birch |
| Veery | Buffalo berry |

ECOSYSTEM:

# Montane Forest

## Steep, moist, and green

Montana's famous mountain ranges—extending from the Purcells southeast to the Beartooths—are part of what scientists call the montane forest ecosystem. These mountains, found mainly in the state's western third and comprising roughly one-quarter of Montana's land base, were formed when continental plates collided and volcanoes spewed lava flows that were later eroded by glaciers, creating cirques and U-shaped valleys. The high elevations—up to nearly 13,000 feet in the Beartooth Range—cause clouds to release rain and snow that nurture forests composed of lodgepole pine, Douglas fir, ponderosa pine, western red cedar, and western larch.

The northwestern portion of this ecosystem is Montana's wettest region. Some areas receive more than 60 inches of precipitation each year, mostly in the form of snow (over 85 feet some years in Glacier National Park). Other areas of the montane forest ecosystem, such as portions of the Rocky Mountain Front, can see just 15 inches annually.

In addition to conifers, montane forests support diverse plant life, including beargrass, western meadowrue, arnica, and pinegrass. Elk and deer use all montane forest habitats, from high-elevation alpine meadows to forested valley foothills. Other wildlife found in various parts of the steep, forested slopes and interspersed mountain meadows are year-round residents such as the long-toed salamander, snowshoe hare, northern bog lemming, and grizzly bear, as well as seasonal migrants like the flammulated owl, harlequin duck, and olive-sided flycatcher.

From mountain forests flow the headwaters of Montana's world-renowned trout rivers, including the Big Hole, Bitterroot, and Blackfoot. Springs and melting snowpack also feed the Clark Fork River, which has been dammed in several places near the Idaho border to provide hydropower, blocking the historic migration routes of native bull trout and westslope cutthroat trout.

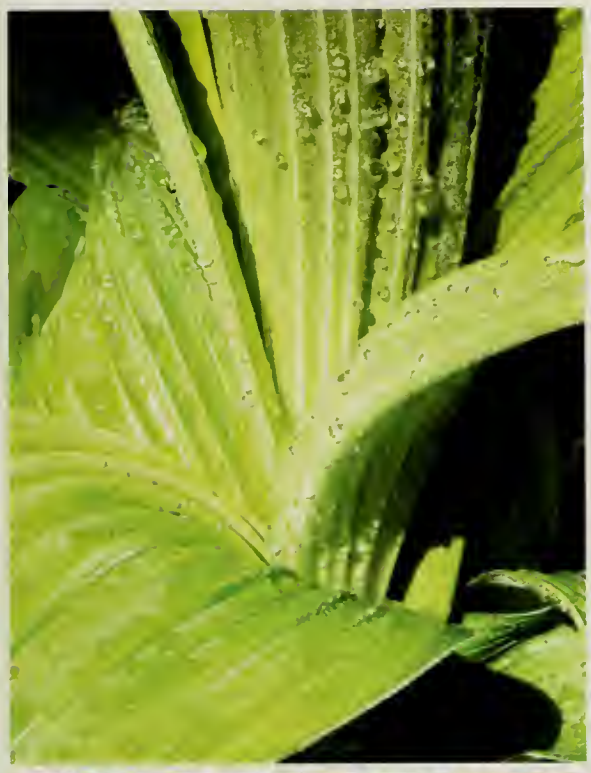
A major threat to montane forest fish and wildlife is the fragmentation of habitat caused by new housing and accompanying fences and roads, which can block migration routes and alter critical breeding and wintering areas. Another problem is fire suppression, which stifles the flames that historically created mosaics of habitat that supported a diversity of species.

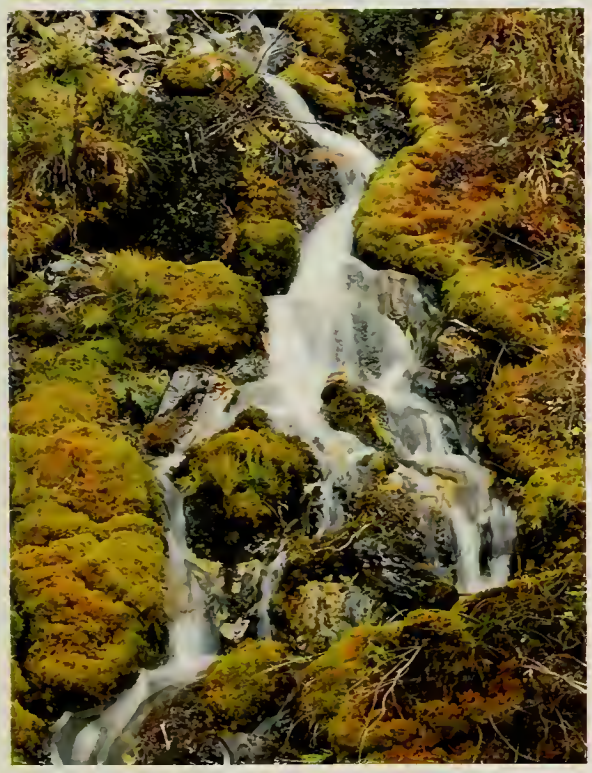
Juan de Santa Ana
**Facing page:** Playing a trout at Holland Lake, near Condon.

Donald M. Jones
**Above:** Grizzly bear sow and cub.

LINDA KELLY
**Facing page:** Raven secret.

DEA VOGEL
**Below:** Sunset handshake.





Chris Boyer
**Facing page:** Undulating rows, Gallatin Valley.

Steven Akre
**Top:** Cornlily.

Craig & Liz Larcom
**Right:** Hiking through Neat Coulee, White Cliffs of the Upper Missouri National Wild and Scenic River.

Steve Mitchell
**Above:** Endor Creek, Flathead National Forest.

Fish and Wildlife Community **MIXED SHRUB AND GRASS**

Mixed shrub and grass communities are often dominated by sagebrush and other shrubs interspersed with native grasses. These communities can have either moist or dry soil and are usually found at low elevations and along lower slopes. As the transition between pure shrub communities and pure grass communities, mixed shrub and grass communities support a unique assemblage of mammal, bird, and reptile species.

D. Linnell Blank
**Facing page:** Round Butte behind a complex of mixed shrubs and grasses, south of Geraldine.

Steven Gnam
**Left:** Sunrise over the Pryor Mountains.

Donald M. Jones
**Below:** Badgers.

Coverage: 5% of Montana (4,159,693 acres)

Number of species that depend on this habitat for breeding and survival:

2 Reptiles
3 Birds
5 Mammals

Examples of animal and plant species:

| | |
|---|---|
| Burrowing owl | Yucca |
| Ferruginous hawk | Idaho fescue |
| Sagebrush lizard | Snowberry |
| Desert cottontail | Sumac |
| Greater sage-grouse | Chokecherry |

ECOSYSTEM:

# Intermountain Grassland

## Foothill prairie

Elk hunters, trout anglers, and bird watchers have always been drawn to the open, sweeping valleys of western Montana known as intermountain grasslands, or foothill grasslands. Often cut by large rivers such as the Big Hole and the Bitterroot, these scenic areas are transition zones between plains grasslands and montane forests. Examples include the Deerlodge Valley, Flathead Valley, Little Belt foothills, and foothills of the Rocky Mountain Front.

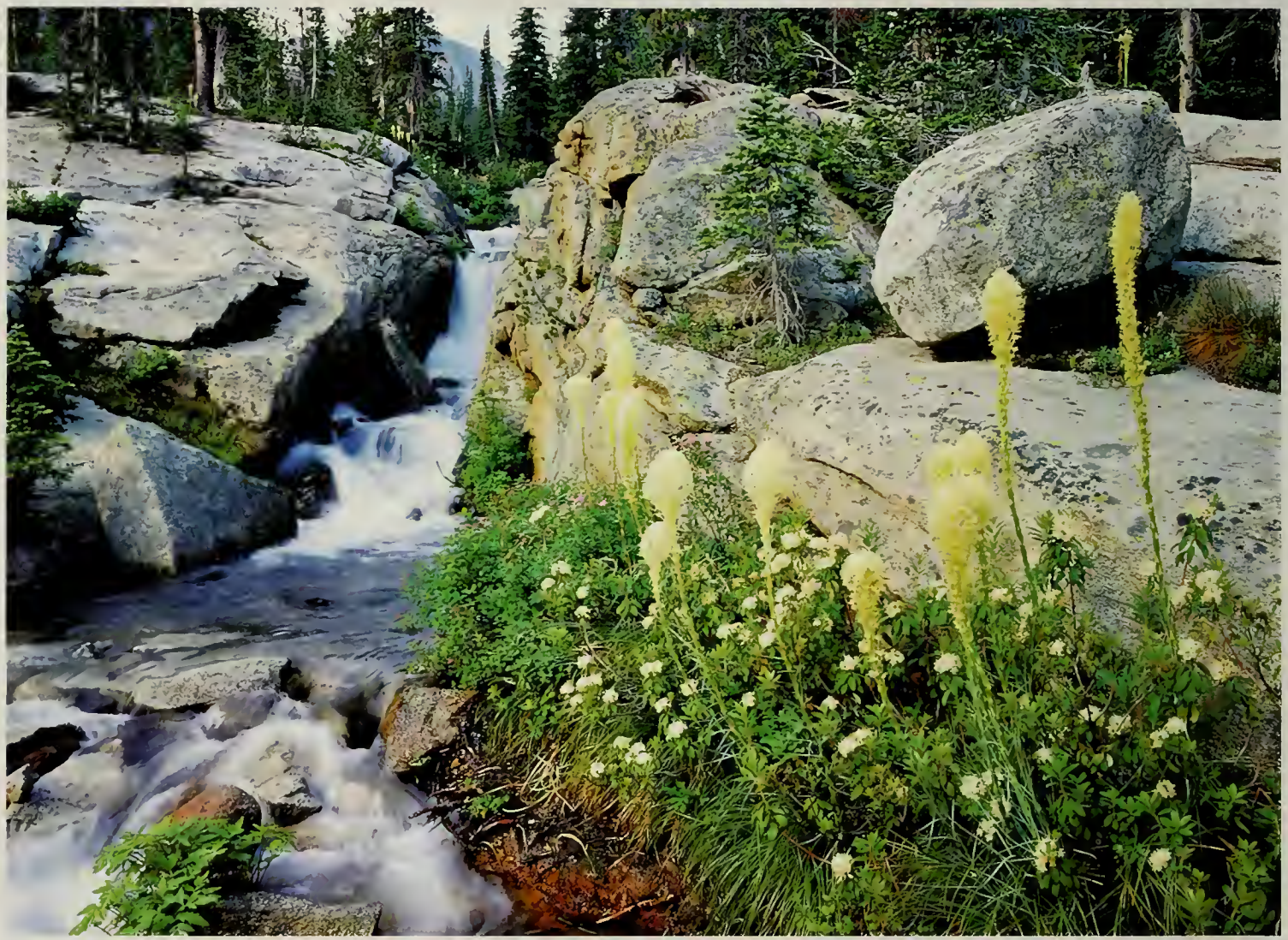
Though wetter than the semiarid plains grasslands to the east, foothill grasslands don't see much precipitation. Broad areas such as the Beaverhead and Helena valleys receive less than one foot each year, while the intermountain grasslands in the Blackfoot and eastern Flathead valleys receive only 12 to 16 inches.

This ecosystem comprises landscape diversity ranging from low-elevation rivers and grasslands to mid-elevation shrublands and forests. Found here are plant species ranging from geyer willow in river bottomlands, prairie Junegrass in sunny sites, and ponderosa pine in the foothills. This vegetative diversity supports a wide range of fish and wildlife, including elk, grizzly bears, meadow voles, sandhill cranes, western meadowlarks, westslope cutthroat trout, and mountain whitefish.

Though covering only about 14 percent of Montana's land base, foothill grasslands are home to some of Montana's largest human populations in cities such as Bozeman, Missoula, Kalispell, and their surrounding communities. Sweeping vistas, access to rivers, and abundant wildlife make these areas attractive places to live. Over the past two decades, thousands of new homes have popped up in foothill grasslands where mostly elk and cattle once grazed. The accompanying access roads, fences, and soil disturbances often fragment habitat, degrade trout streams, block historic wildlife migration routes, and attract exotic plants such as spotted knapweed. Among the fish and wildlife species most at risk from development and other human activities in portions of this ecosystem are the black tern, Townsend's big-eared bat, pygmy rabbit, and bull trout.

Chuck Haney

Right: Grasslands on the Rocky Mountain Front.

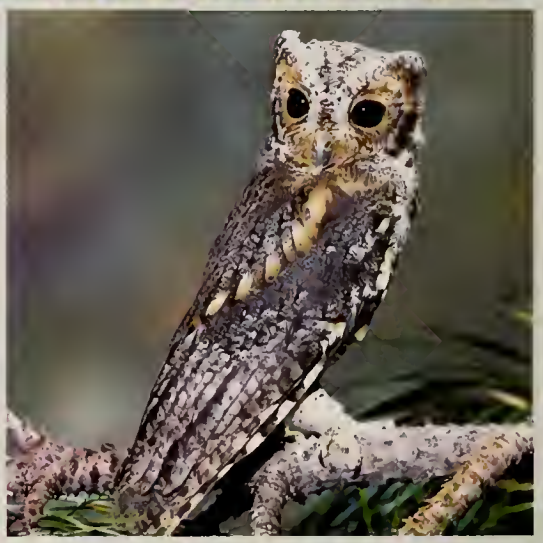


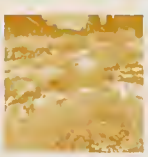
MARK LAGERSTROM
**Above:** Chaffin Creek, Bitterroot Mountains.

MICHAEL HARING
**Facing page:** Spawning rainbow–cutthroat "cut-bow" hybrids.

ALAN G. NELSON
**Far right:** Flammulated owl.

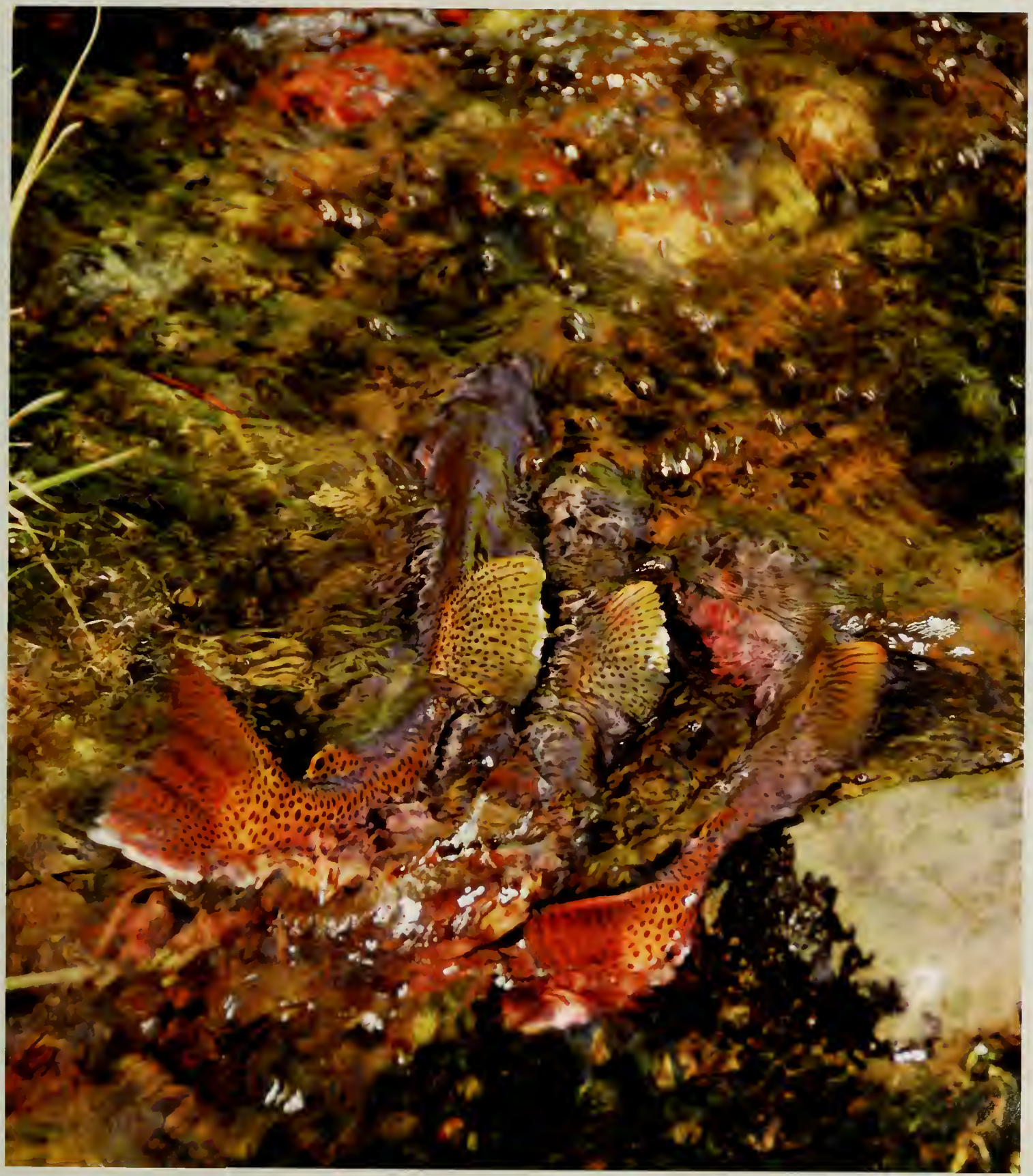
THERESA JOHNSON
**Right:** Aspen leaf on Six Mile Creek, near Huson.





Fish and wildlife community **MOUNTAIN STREAMS**

Mountain streams of western and central Montana are typically cold and clear, and serve as the headwaters for all major river systems in Montana. Mountain streams often flow through montane conifer forests beginning at the highest elevations. These streams are home to coldwater native fish species, many of which are declining due to habitat degradation, dams, genetic hybridization, overfishing, and outcompetition by introduced salmonids. These streams support bull trout and the remaining genetically pure stocks of Montana's Yellowstone and westslope cutthroat trout.



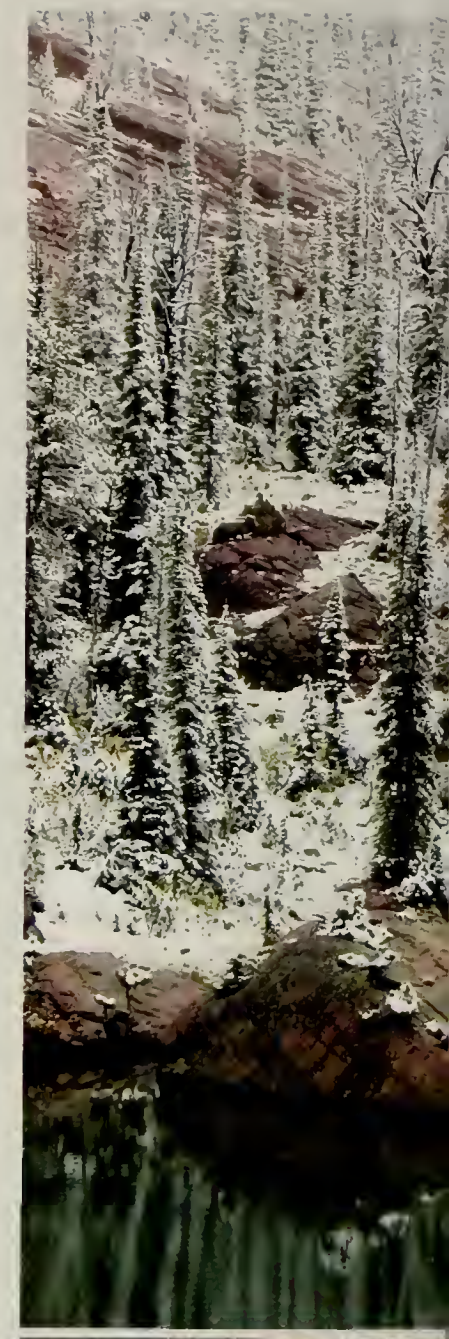
Coverage: 59,364 stream miles in Montana

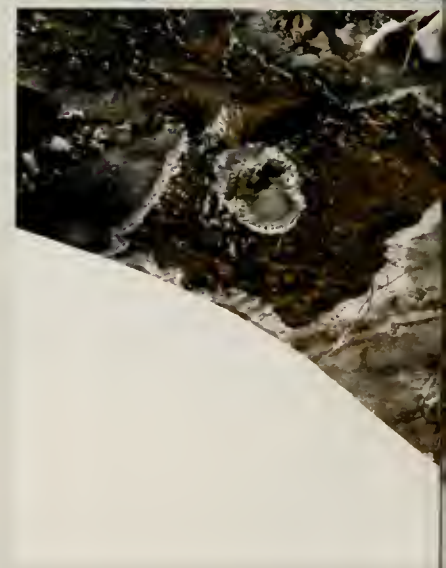
Number of species that depend on this habitat for breeding and survival:

1 Mussel
1 Crayfish
18 Fish

Examples of animal and plant species:

| | |
|---|---|
| Bull trout | Serviceberry |
| Arctic grayling | Red-twigged dogwood |
| Slimy sculpin | Narrowleaf cottonwood |
| Pearlshell mussel | Monkeyflower |
| Westslope cutthroat | Beargrass |





Tony Bynum
**Facing page:** Sandhill cranes in wet snow.

Steven Gnam
**Above:** Jewel Lake, Swan Valley.

Craig & Liz Larcom
**Left:** Ice patterns on a slow spot in Belt Creek.

Wes Uncapher
**Above:** Sunset bull.

Linda Kelly
**Facing page:** Bull elk steaming at first light.

Gary Kramer
**Below:** Cow elk drinking from a lake.

ECOSYSTEM:

# Plains Grassland

## High shortgrass prairie

Montana's plains grasslands are part of North America's Great Plains, which stretches from Alberta south to Mexico, and make up nearly half the state's land base. These flat or gently rolling prairies are broken up by scattered river valleys, primarily the Yellowstone and Missouri and their eastern tributaries, as well as isolated prairie forests in small "island" mountain ranges such as the Bull and Big Sheep.

The high eastern plains contain the most diverse plant communities in Montana. Vast fields of shortgrass prairie composed of bluebunch wheatgrass, blue grama, and little bluestem brighten in midsummer when yellow prairie coneflowers, purple dotted blazing stars, and other forbs bloom. This ecosystem also contains shrubs such as rubber rabbitbrush and big sagebrush, though not in densities as great as in the shrub grassland ecosystem. Along prairie streams grow stands of cottonwood, box elder, green ash, and western snowberry. And scattered across grassy hills and mountains are small forests of Great Plains ponderosa pine, a shorter and less water-dependent cousin to the more well-known conifer found in western Montana.

Though pronghorn and mule deer (and, historically, bison) are the most famous residents of Montana's plains grasslands, these prairie seas also hold a remarkable diversity of other wildlife and, surprisingly, fish species. The lower Yellowstone and Missouri harbor pallid sturgeon, paddlefish, blue sucker, burbot, sauger, and two dozen other species. Tributary rivers such as the Milk, Tongue, and Musselshell, as well as prairie streams weaving across the dry landscape, are home to emerald shiners, channel catfish, madtoms, and other fish native in Montana only east of the Continental Divide. Notable wildlife species include the piping and mountain plover, Townsend's big-eared bat, black tern, black-footed ferret, black-tailed prairie dog, and milksnake.

As it has been since pioneers first began turning topsoil, the greatest disturbance to native prairies is the plow. Though crops provide nutrients that benefit many wildlife species, the ongoing conversion of grasslands to cropfields denies other species vital habitat necessary for survival.

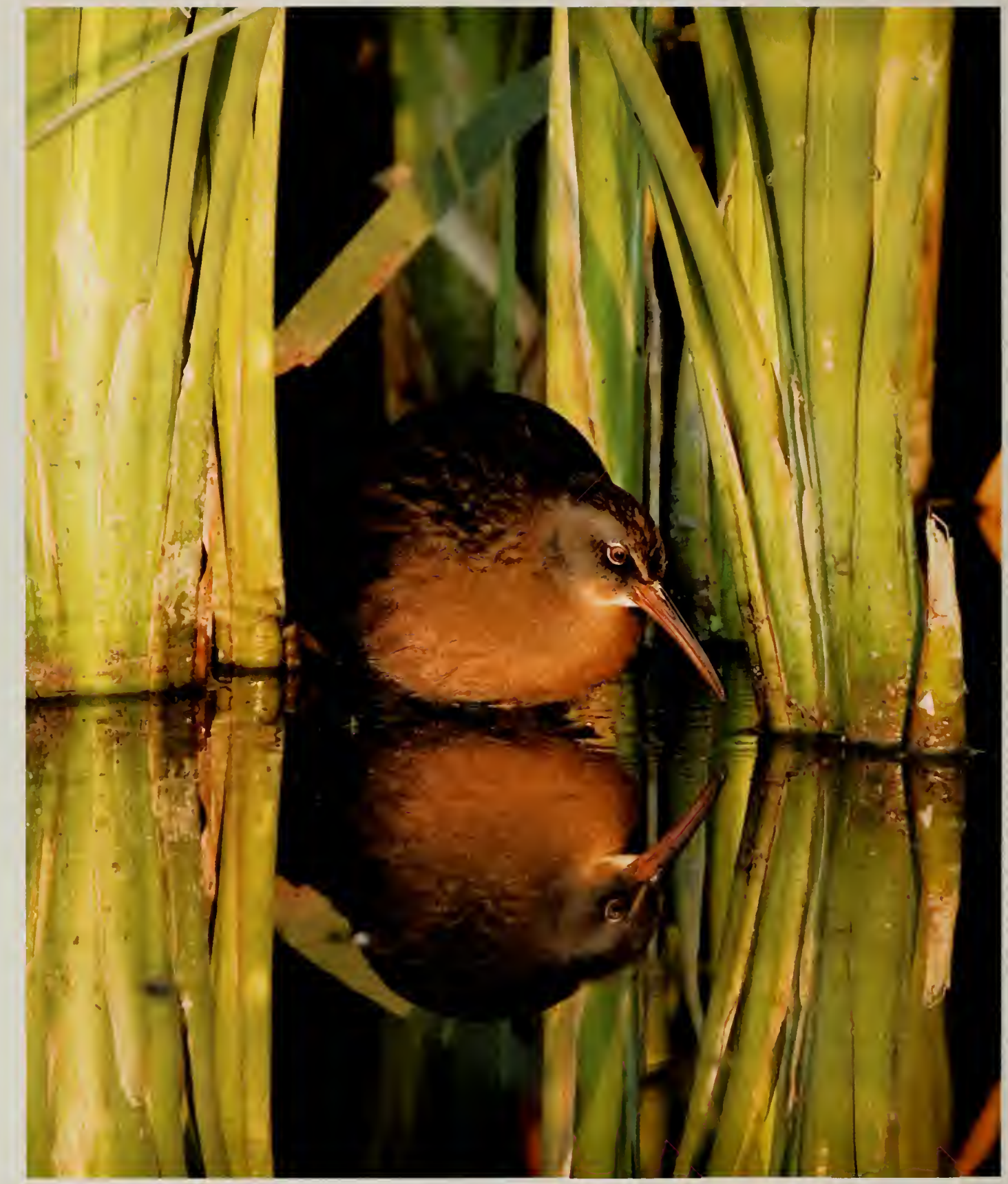
Diane Hargreaves

**Left:** Cottonwood bottoms, Charles M. Russell National Wildlife Refuge.

Barry & Cathy Beck
**Facing page:** Rainbow trout.

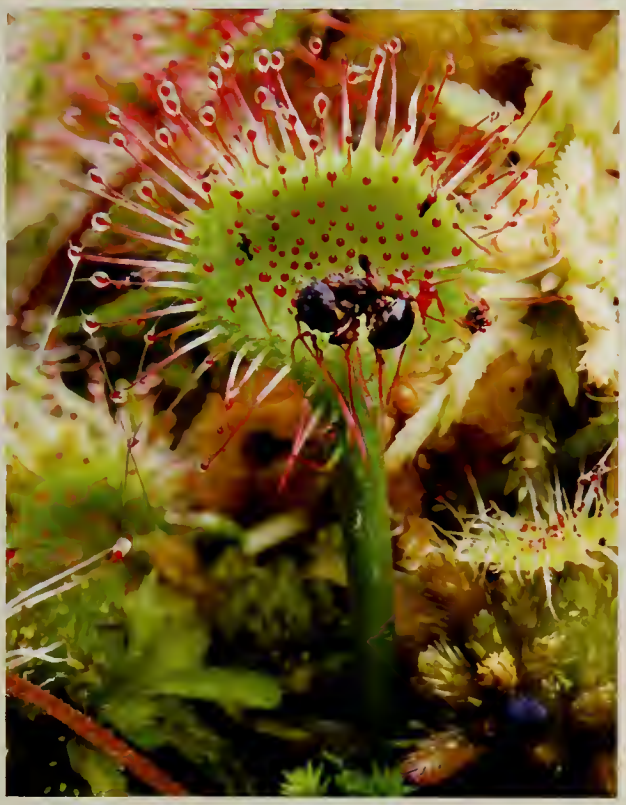
Dušan Smetana
**Top:** Fishing guide, Bighorn River.

Bob Martinka
**Above:** Duck hunter and dog, Lake Helena.



Fish and wildlife community. **RIPARIAN AND WETLAND**

Montana's riparian and wetland communities represent the green zones along rivers, streams, lakes, and reservoirs and include potholes, wet meadows, marshes, and fens. Riparian community types include the cottonwood forests that help stabilize stream banks and keep waters cool in summer. Riparian and wetland communities support the greatest concentration of plants and animals in Montana and serve as a unique transition zone between aquatic and terrestrial environments.



Bob Martinka
**Facing page:** Virginia rail.

Kenton Rowe
**Above:** Missouri River mink family.

Jaime & Lisa Johnson
**Above:** Dragonfly, Salmon Lake.

D. Linnell Blank
**Left:** Unlucky ant trapped in a sundew.

Coverage: 4% of Montana (3,724,224 acres)

Number of species that depend on this habitat for breeding and survival:

| | |
|---|---|
| 16 | Amphibians |
| 6 | Reptiles |
| 149 | Birds |
| 22 | Mammals |

Examples of animal and plant species:

| | |
|---|---|
| Pygmy rabbit | Bulrush |
| Western toad | Red-osier dogwood |
| Snapping turtle | Lake sedge |
| Black tern | Western larch |
| Common loon | Cinquefoil |

ECOSYSTEM

# Shrub Grassland

## High desert sage

Fans of this ecosystem—and there are many—refer to shrub grasslands as "seas." Rolling hills of gray-green shrubs appear as waves stretching to distant horizons, and prairie falcons soar overhead like seagulls. Also known as high desert, many shrub grasslands are at elevations above 3,000 feet and endure scorching summers, bitter-cold winters, and a persistent lack of rain.

Sage-grouse and pronghorn are the most recognizable residents of this ecosystem, but shrub grasslands are also home to dozens of other bird, mammal, reptile, and amphibian species that make it a rich and diverse landscape.

Many animals rely on big sagebrush and silver sagebrush, the dominant plant species here. Sagebrush act as miniature forests, their canopies providing shade and shelter. To survive in this semidesert environment, where precipitation can average as little as 10 to 12 inches per year, sagebrush produce hairlike fibers on their leaves that block wind and reduce evaporation, while the plant's taproot can extend down 6 feet to draw moisture deep from the soil. Sage-grouse are among many wildlife species that rely on nutritious sage leaves to survive the brutal winters that tear across this open landscape.

This ecosystem also contains greasewood, fringed sagewort, rubber rabbitbrush, and grasses such as sandberg bluegrass, bluebunch wheatgrass, and prairie junegrass. Shrub grasslands are home to white-tailed jackrabbits, gopher snakes, and, in winding prairie streams, native fish such as the pearl dace and stonecat.

Found scattered across the state's southern tier from Carter County in the east to Beaverhead County in the west, shrub grasslands make up less than 8 percent of Montana's land base, and the acreage is shrinking. The biggest loss comes from burning or spraying sagebrush to create more pasture and cropland. A growing threat is natural gas drilling, which fragments habitat with roads, transmission lines, gas pipes, and other infrastructure. Among the species most at risk from shrub grassland conversion and fragmentation are the greater sage-grouse, long-billed curlew, burrowing owl, and milksnake.

W. Steve Sherman
**Facing page:** Mule deer buck.

Carol Polich
**Above:** The Terry badlands.

Rodney Schlecht
**Left:** White-tailed jackrabbit.

Fish and wildlife community **SAGEBRUSH**

The sagebrush community includes all sagebrush and associated grasses and shrubs, although specific attention is focused on the "shrub steppe," a transition zone between arid shrubland and semiarid grassland that occurs primarily in eastern and southeastern Montana alkali flats. The sagebrush community is a mosaic of sagebrush plant species that occur in discontinuous pockets throughout Montana, although mostly in the eastern two-thirds.

NOPPADOL PAOTHONG
**Facing page:** Sage-grouse.

JUDY WANTULOK
**Left:** Pronghorn doe chasing a coyote through sagebrush.

DARRIN SCHREDER
**Below:** Makoshika State Park.

Coverage: 6% of Montana (5,625,886 acres)

Number of species that depend on this habitat for breeding and survival:

| | |
|---|---|
| 3 | Amphibians |
| 7 | Reptiles |
| 32 | Birds |
| 16 | Mammals |

Examples of animal and plant species:

| | |
|---|---|
| Mountain plover | Black sagebrush |
| Sage-grouse | Basin big sagebrush |
| Pronghorn | Greasewood |
| Spotted bat | Rubber rabbitbrush |
| Burrowing owl | Saltsage |

LAWRENCE STOLTE
**Top:** Mailboxes along a rural road, near Kila.

CHRIS BOYER
**Above:** Croplands point north to the Sweetgrass Hills.

Erik Petersen
**Top:** Windmills, near Judith Gap.

Rebecca Stumpf
**Above:** Riprap along the banks of the Yellowstone River, near Billings.

**Ron Boggs**
A small mountain stream running beneath Refrigerator Canyon's 200-foot-tall limestone walls.

**Denver Bryan**
Facing page: Bighorn sheep.

**SKY SNAGS** Last summer near Polebridge, photographer Nick Fucci and two photographer friends were taking pictures of fireweed blooming in stands of charred lodgepole pine when Fucci happened to look up. "It caught my attention how the tips of the blackened trees were coming together and then disappearing into the sky," he says. "I lay down on my back, made some adjustments to get the composition right, and that's the image you see here."

TOP HONORS
For the past three years, *Montana Outdoors* has been ranked as one of the nation's best state conservation magazines by the Association for Conservation Information.

Montana Outdoors

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